Orbits

Sandeep Gupta

"If you are under 40, and are using C++ for a living, maybe you should reconsider your decision…"

- recycled

"If you are under 40, and are using C++ for a living, maybe you should reconsider your decision..."

- recycled

I am 27!

(27 years, 2 months, 19 days)

"If you are under 40, and are using C++ for a living, maybe you should reconsider your decision..."

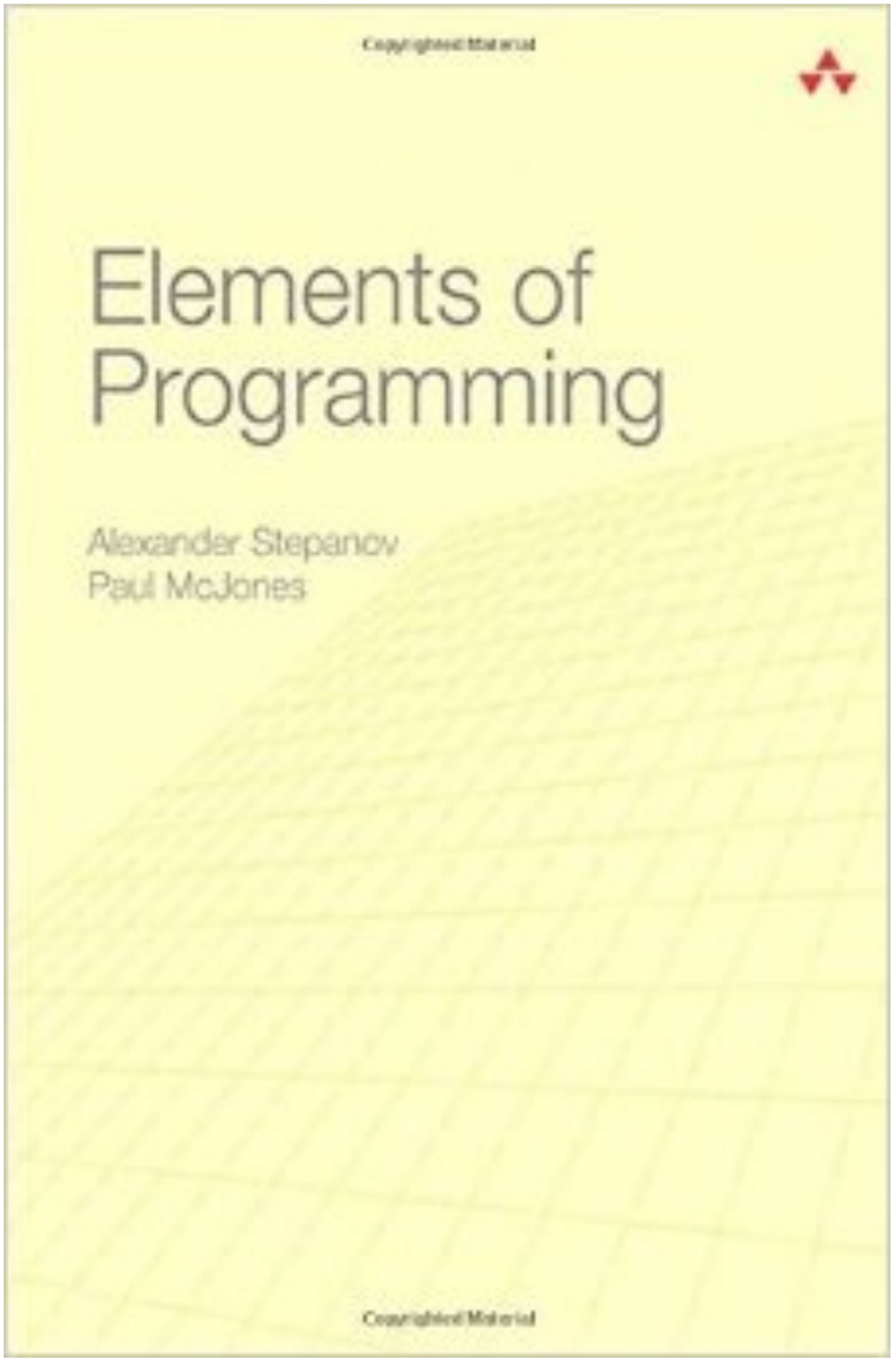
- recycled

I am 27!

(27 years, 2 months, 19 days)

Understand programming from a language oblivious point of view.

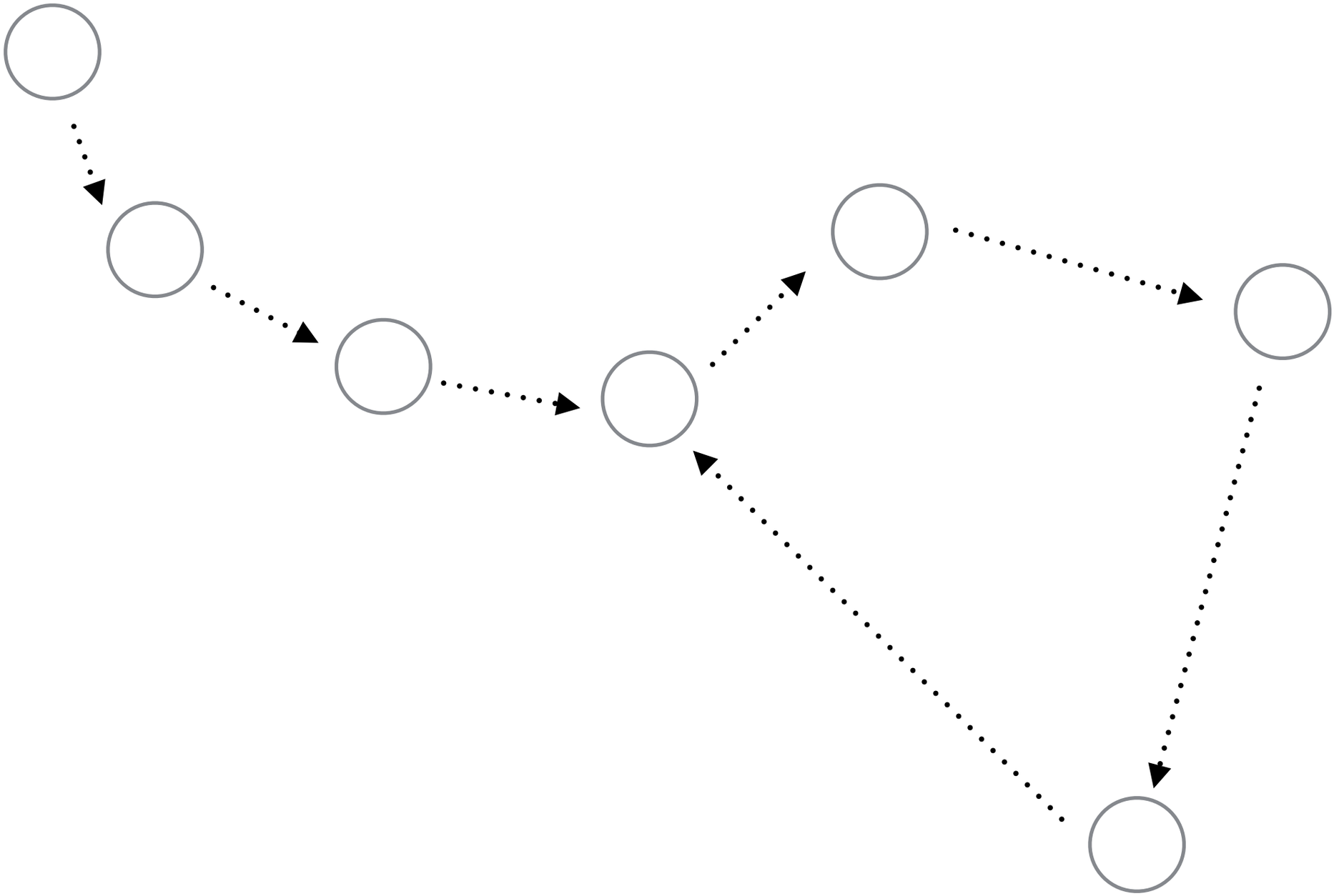
You are going to
waste next 4.5 mins of life
if you have already
read this book

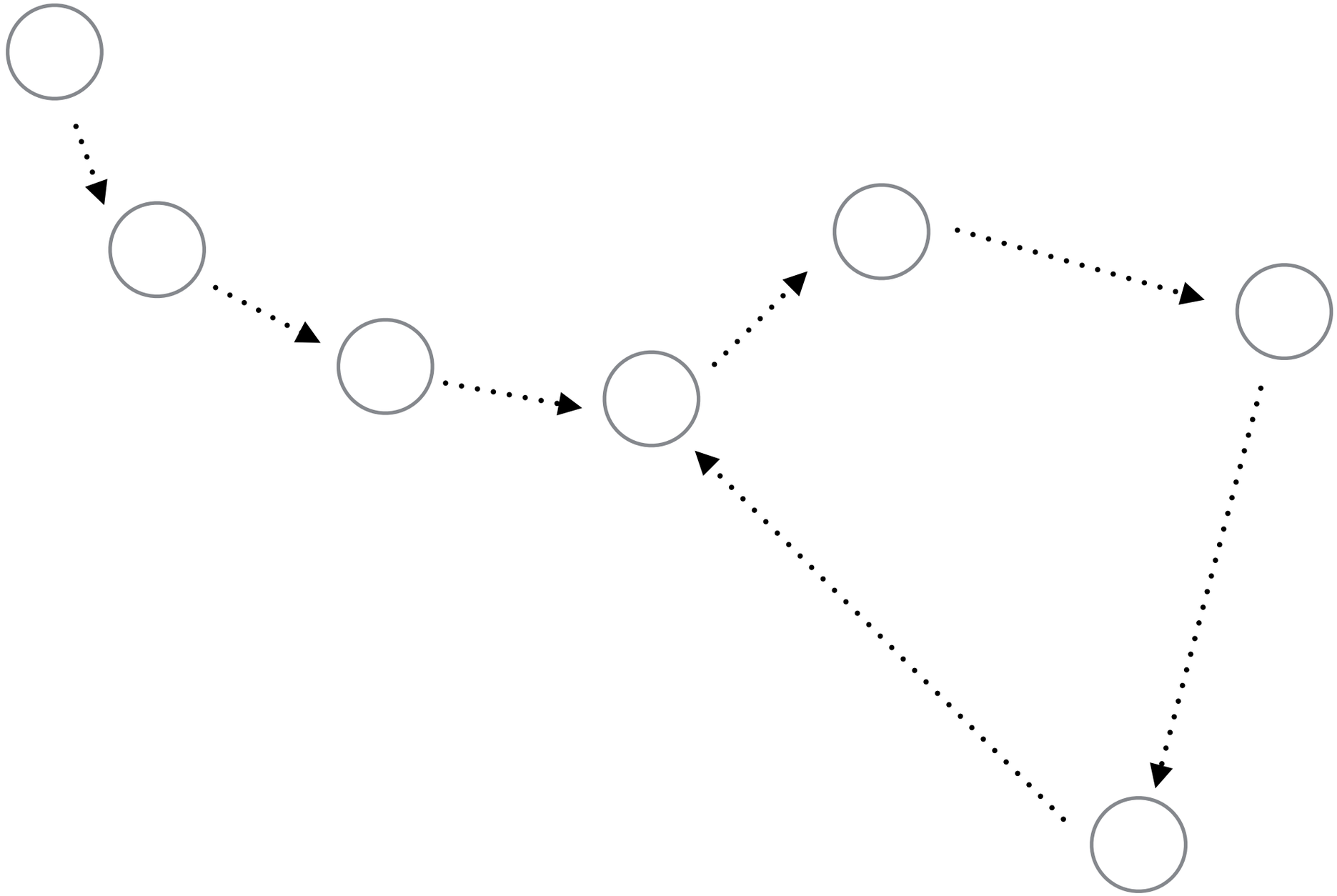


What is the MOST common programming interview question (ever)?

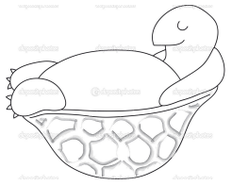
What is the MOST common programming interview question (ever)?

Detect a loop in a singly linked list?

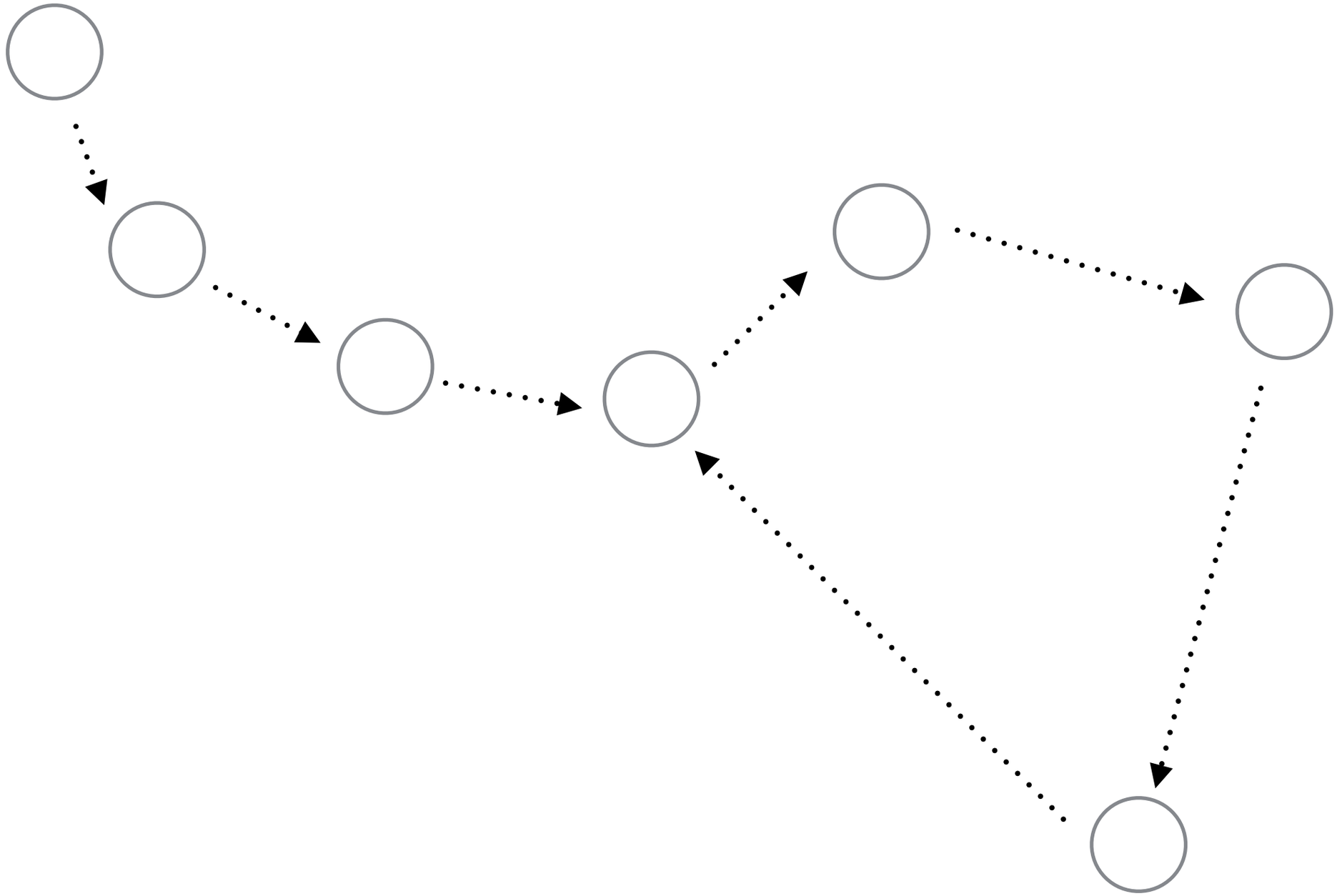




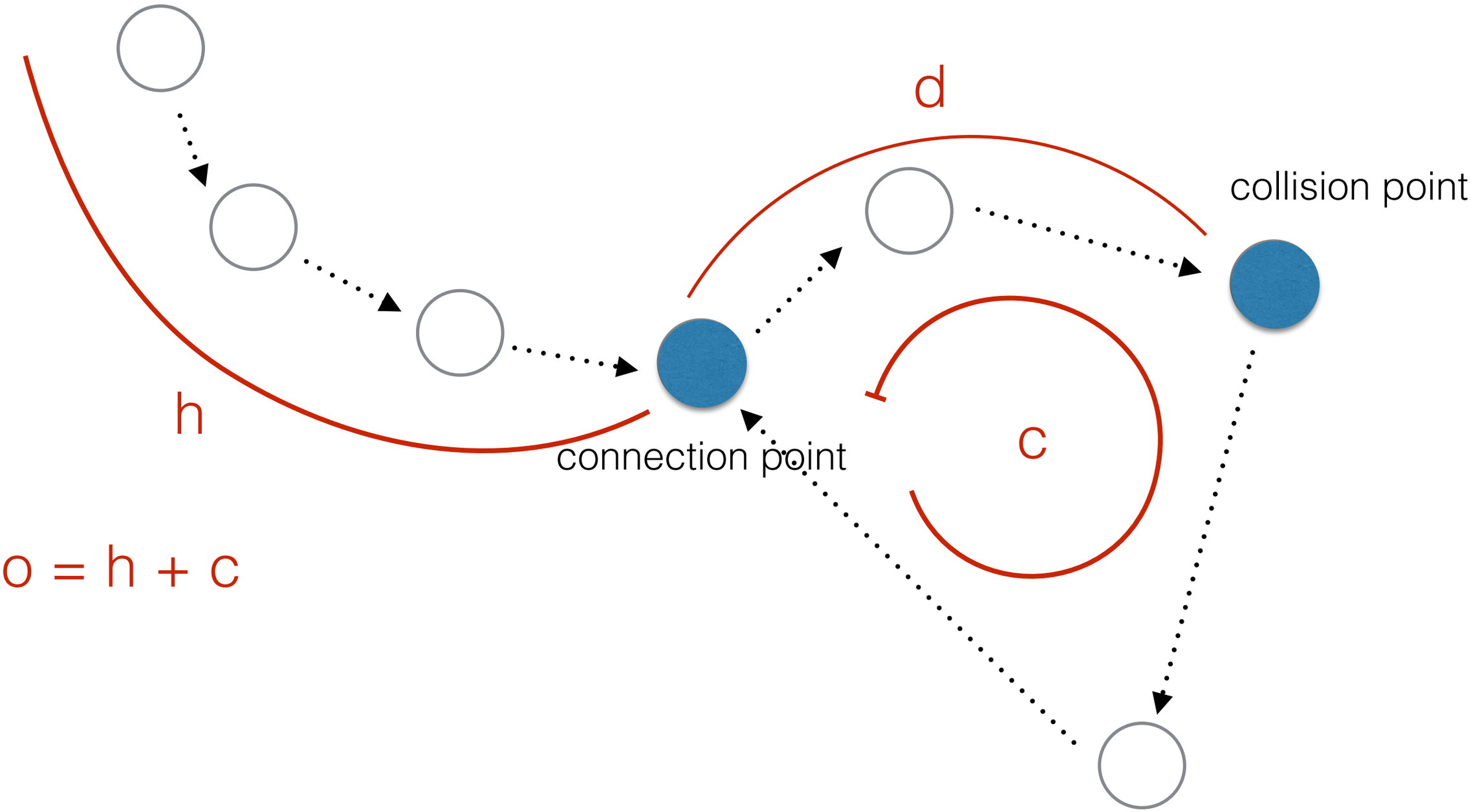
https://en.wikipedia.org/wiki/Ursa_Minor



https://en.wikipedia.org/wiki/Ursa_Minor



https://en.wikipedia.org/wiki/Ursa_Minor



$o = h + c$

https://en.wikipedia.org/wiki/Ursa_Minor

$$
\begin{aligned}
&\mathit{Transformation}(\mathsf{F}) \triangleq \\
&\quad \mathit{Operation}(\mathsf{F}) \\
&\quad \wedge\ \mathit{UnaryFunction}(\mathsf{F}) \\
&\quad \wedge\ \mathsf{DistanceType} : \mathit{Transformation} \rightarrow \mathit{Integer}
\end{aligned}
$$

```
9 // Step to the next node
8 template <typename T>
7 T* transformation(T* node)
6 {
5     return node->next;
4 }
```

DistanceType(F) is an integer type large enough to encode the maximum number of steps by any transformation f ∈ F from one element of T = Domain(F) to another.

Orbit: The orbit of *x* under a *transformation f* is the set of all elements reachable from *x* under *f*.

$$f^n(x) = f^{2n+1}(x)$$

High school algebra

$$n = h + d$$
$$2n + 1 = h + d + qc$$

q = number of full circles fast moves

$$2(h + d) + 1 = h + d + qc$$
$$h + d + 1 = qc$$
$$mc + r + d + 1 = qc$$
$$d = (q - m)c - r - 1$$

h = mc + r

0 <= d < c

q - m = 1

$$d = c - (r + 1)$$
$$e = r + 1$$

e = distance from collision point to connection point

$$f^{h+d}(x) = f^{h+c-r-1}(x) = f^{mc+r+c-r-1}(x) = f^{(m+1)c-1}(x)$$

http://web.archive.org/web/20150623025348/http://compsoc.dur.ac.uk/whitespace/

Thanks!

https://github.com/skgbanga/CppCon16/tree/master/talk